BONNEVILLE SALT FLATS
TECHNICAL REVIEW COMMITTEE
MEETING
OCTOBER 10, 1990
9:00 a.m.

Deane Zeller called the meeting to order at 9:15 a.m. on October 10, 1990.

Those in attendance were Steve Brooks, Deane Zeller, Jordon Pope from BLM Salt Lake District; Ron Baugh, Don Buhler, Jim Kohler from BLM, Utah State Office; Joe Gates, Jim Mason, Lee Case, Geoff Freethey, and Bil Brothers from USGS; J. Wallace Gwynn from UGMS; Stan Plaisier from Bingham Engineering; Hugh Coltharp from Utah Salt Flats Racing Association; Dianne R. Nielson from State of Utah UDOGM; and Paul Anderson, independent.

He discussed the upcoming Coalition Group meeting on October 16 stating there is a need to give the Coalition a plan of attack and a cost estimate so they can find the money to fund the job. Other topics that need to be drawn to a conclusion are whether or not to keep Pilot Valley as analogy and how to explore the wind driven ponding phenomenon.

Steve stated the first item on the agenda was a report on BLM/USGS elevation surveys and well locations.

Don Buhler discussed the BLM meeting with USGS. Stated they now have 67 drill holes and 20 more east of the track. Need to confirm old geodetic survey markers and the location of the wells. May use GPS for modelling. May do all with differential leveling. Plotted the holes and benchmarks on a map. There is a scarcity of level loops out there. Need to verify the benchmarks, proceed with the GPS and then connect the vertical components with the level loops on the northwest to see how it works out. Need to talk to Loyd Austin of State Water Resources about leveling problems that encounter.

Steve asked could the salt loss be related with the elevation data. Need to know about it.

Don Buhler said they need to verify the benchmarks. Have a GPS system using Motorola Eagles (2 to 3 cm in horizontal) and Tremble pathfinders for mapping to 5 meters.

To get the initial XYZ they need 20 days for GPS, 20 days for the vertical with the differential leveling, 16 days for the horizontal and 2 days for the initial check.

On new drill holes, will check to see if there is movement (i.e. frost heave). Will check next spring and that will have an effect on the reading. Will also check to see if there is heave at different amounts in different areas.

Steve stated agenda item 2 as wind erosion. The three options to be considered are (a) a literature search to backup the consensus decision that wind erosion is not significant, (b) small scale tests to determine significance, and (c) a full scale study.

There are different ways of determining wind erosion. So far have found it to be not significant.

Hugh stated that vehicles take off more salt than the wind.

Lee said it would be expensive to study but had a feeling that it was not significant. Need a test to disprove. If detail the salt balance for the project with significant unknowns, can't determine if it is significant.

Steve indicated a wind test with generator and particle sample would be a good study. Could do the salt balance first.

Lee said that wouldn't have data behind it if need it to prove it is valid.

Paul A. indicated that a decision would be intuitive and consensus was that it was not a high priority and could come back to it later. Do high priorities first.

Deane affirmed that wind erosion is not critical to any work USGS is going to do.

Steve moved on to agenda item 3, are wind driven floods of brine a significant factor leading to salt loss and if so, it is expensive.

Lee said there is a need to do mass balance or will be pulling numbers out of the air. Balance is essential. Lines does have some numbers. Can do sensitivity analysis, air calculations,and mass balance.

Geoff stated we can do it now and later as it related to salt transport. Means of moving salt around is not critical. Need to know how much salt is removed by Reilly in ditches and by ditches.

The priority is to collect necessary information to reduce the error in the balance. Then can better quantify the movement under the highway and amount removed by ditches.

Paul A. reminded that main issue is salt loss, not movement direction of salt, but total removal of salt. Racing surface can change in a year while study the movement of salt for it.

Steve added that need to know how salt is distributed. Can't assume that it blows over there and let it go.

Lee said the area and volume is important. Put a lot of effort into quantify numbers so can defend. Difficult to get a vehicle out there at times.

Deane asked what is the plan of study for the migrating ponds.

Jim M. added that aerial flights at periodic intervals to see the size and direction of movement. Need to get samples of water to find volume and concentration of salt, also the depth.

Lee said there is a need to track the ponds to get a full history, don't leave and come back.

Geoff reminded that the more points that can take measurement, the more accurate and also how much air is going to get into the points; 10,000 is more accurate than 100.

Deane asked if in winter can you take sampling of water analysis and is there diversity in chemical concentration of the ponds.

Lee asked does it evaporate, precipitate or stay in solution.

Geoff said that must assume there is an evaporative pan laying on the salt.

Lee added it is important to know the configuration of the ponds, the meteorological setting.

Is the mechanism for salt transportation wind driven ponds and if it gets into the shallow brine system or can it go into the ground. Need to know what the head is, the concentration, infiltration rates, and must check chemical flow places. Also need to know the temperature and density on the surface and in the ground. This is the basis for the net gain or net loss. How much salt it leaves? Do gradients reverse? It's complex.

Stan stated that Lines did a volumetric evaluation and hydrologic evaluation. Need to do something now to find if salt water ponding is critical. How much relates to mining operations. If 90% of the loss is due to ditches, need to evaluate. If 20% loss, then minimal.

Paul added we can combine our ideas of mass balance to track where ponds are with routine monitoring and aerial photography.

Deane stated the BLM premise is zero salt loss is only acceptable loss. Any salt deposited within x distance of collection is going to be lost to that system. Solution is to not let any salt get into any system.

Dianne said we need to know where the area of influence is so we know where to place berms and if we can place berms farther out to confine the ponds.

To track the ponds, we could substitute oblique photography in place of aerial photography.

Lee indicated that the mechanism we've proposed is a reasonable method. Is it worth putting an effort into it. Can't prepare salt balance until we get more data or the error is too large.

Stan added that confine data collection and know where to focus such as on the numbers and what is coming off the ditches. Have little mechanisms to study surface ponds off-site and would need to spend more money to evaluate.

Deane asked how much money to we need.

Lee asked do we evaluate the ponds this wet season or later.

Hugh added that do overflights in March.

Paul said that wind driven ponding is not a priority area that could cut only if funding available.

Lee added that need to ask for funds and give it a chance to be funded so can look for results, evaluate, and continue pursuing it if evaluation indicates.

Deane stated we need to have enough to cover needed items in our request to Congress.

Lee said that won't proceed on this item until budget received and know what is available. Proceed on other priorities.

Deane added that funding is $100,000 per year for 3 years. We're in 2nd year now.

Dianne said that may determine it is important and ask again next year if find that it is needed.

Steve added collect samples while you're out there.

Deane concluded that need $800,000 as a strategy to cover everything.

Steve stated agenda item 4 is consideration of the Pilot Basin analogy; also, to determine if there is a need for a resource assessment in light of the exchange proposal and to discuss the study that Craig Forster is doing.

Steve added that Craig Forster will tell about his study on November 7 and 9:00 a.m.

Dianne added that need controls in Pilot Valley study within the context of the study proposed.

Geoff said that use Pilot Valley to find out what the Bonneville Salt Flats were like before intervention of human beings.

Basic hydrologic system there has inflow from surrounding mountains and discharge from evaporation. Can study how the salt crust changes seasonally. Can measure the salt crust thickness, measure the wells that are monitoring and note dissolved concentrations of brine during year. Want to measure water and salt levels and balance. Do a water analysis for salt crust thickness.

Craig Forster's study is the deep circulation of brine in terms of isotopes. He has a test area to train student in hydrology.

Lee said we need to check the numbers in Pilot Valley and compare to Bonneville Salt Flats.

Dianne asked what is the BLM's role and what is the need to go forward in a resource evaluation.

Deane replied that any exchange in the future is at the prerogative of Reilly. BLM doesn't really have a need for a resource study but it the conditions say we need it, we will go along.

Steve asked what is the size of the resource and what is the compatibility.

Wally added that USU has been conducting a study on Pilot Valley for the last several years. They have several clusters of wells, weather data, etc. Chris Duffy, who is now at Penn State, did the study.

Lee said that USGS funded the study and he came up with the theory of the movement of brines.

Deane asked how important is the facet of Pilot Valley to understanding what is happening on the Bonneville Salt Flats.

Jim K. stated we need to look at Pilot Valley to give the basis for an exchange to allow Reilly to consider it.

Asked if there is a perennial salt crust in Pilot Valley?

Geoff replied that some years there isn't any, it depends on the weather. Pilot Valley is a closed system and would give information about salt loss, how salt moves within the system, how density changes because of fresh water, and how it interacts with the brines underneath it.

Jim K. stated that BLM is attempting to classify the potash resource there, the salt system is beyond the scope of BLM.

Lee said the Pilot Valley will give some figures because similar to Bonneville Salt Flats in transferability so would give numbers to compare.

Dianne added the Pilot Valley needs to stay in because of the hydrologic perspective.

Deane asked what about the mineral aspect.

Paul can use Reilly's old ponds because they are subject to the same influences.

Steve asked if we should keep Pilot Valley in the study.

Paul said it gives a comparison in the variations in density and the surface changes in the crust. The related seasonal fluctuations in salt loss help us understand the issue.

Jim K. asked how much USGS study is going into the dynamics of the salt crust study.

Geoff replied the by comparing Pilot Valley and the Bonneville Salt Flats can find what happens to the two crust, how do the 2 crust change throughout the year as to density and thickness. Can compare the salt crust and the soft crust, the density, and the brine concentration.

Joe added the Pilot Valley gradient is to the center. The Bonneville Salt Flats gradient is to the north and the low point near the ditches.

Deane asked do we need a Pilot Valley mineral assessment.

Jim K. replied that need to determine minerals and non minerals to give initial basis for exchange and satisfy Reilly that it is a resource to them and we can exchange.

Competitive leasing is available but it is discretionary.

Deane asked can we hold off leasing.

Jim K. stated that BLM should do mineral assessment classification, then look to see if any information is generated. By 6 months, we'll have classification done.

Steve added that need to know if brine is compatible with Reilly's brine.

Steve stated agenda item 5 as a report on salt replacement tests.

Hugh said they have dragged the track with barrels on 3 beams but there were new buckles on the track. Three weeks ago they got salt from Reilly it bonded really well especially because it rained after. Buckles are the worst between the 7½ and 9 mile areas. Used negative track toward Reilly dike.

They had made 2 patches, one was 18 inches by 15 feet by 1½ inches and the second was 70 feet wide

Steve said that USGS had already discussed agenda item 6.

Jim M. said need to know the wells out there and the locations, number in existence and if usable. 55 wells have been visited, some areas still need to be visited. Put in wells that need for project (14 at present) 14 feet deep, 14 inch casing and 5 inch screen. Will continue to put in more wells; plan to put 4 to 5 wells north of median and some on south side of interstate highway to study the subsurface flow and gradient; plan to put in more wells to study the distribution of the Bonneville Salt Flats area and need shallow production wells to pinpoint underflow from north to south or the aquifer flow.

Lee said they went through an independent technical team for their study and prepared a new proposal. They need to put recorders in ditches to quantify the flow into the ditches.

Wally reminded them they needed to measure the flow of the undisturbed material as well as the fill material.

Jim M. added that fill material is dry gravel so can tell how much roadbed material is involved.

Wally said to test the thickness, how deep.

Jim M. stated that need to look at shallow brine system 8 to 14 feet below the land surface. Plan to put in shallow wells to look at salt levels. Need to isolated with packing so doesn't mix with salt surface then grout with well plugs.

Stan said don't use bentonite because it doesn't seal off and reacts with brine and they have a special well plug.

Steve referred to agenda item 7 on salt crust density and said it had already been discussed.

Agenda item 8 was a discussion of ways to verify previous salt crust volume measurements.

Steve said could look where he surveyed and check volume calculations and salt loss.

Stan asked if he compared the same measurements as in UDOT study of 1988.

Steve said he measured to top of clay, same type of studies.

Stan expressed concern with variation. Asked if BLM report is still undergoing study.

Jim K. said he was still reviewing.

Stan asked how can they do mass balance until finished with internal review.

Jim K. replied they need to qualify the volumes, the volumes and the density.

Deane closed the meeting. Said there was no reason to meet technically for 3 to 4 months, depended on Coalition. Would meet as needed.

Meeting adjourned at 12:55 p.m.